

**REMARKS**

Claims 1-12 are all the claims pending in the application.

Claims 1-5 have been rejected under 35 U.S.C. § 102. Claims 1-12 have been rejected under 35 U.S.C. § 103.

Claim 1 is amended herewith to recite that the process involves a heat exchange system “which provides a jacket outside the tubular reactor, wherein said jacket contains a heating medium that removes the heat of reaction generated by the reaction in the tubular reactor.”

Support for this amendment can be found, for example, on page 8, lines 2-17.

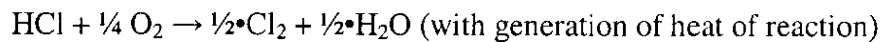
**I. Rejection of Claims 1-5 under 35 U.S.C. § 102**

Claims 1-5 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by EP 0,861,803 (“EP ‘803”).

Applicants respectfully submit that EP ‘803 does not teach each and every element claimed in Claims 1-5.

The instant invention is directed to a process for producing chlorine, which comprises the step of oxidizing hydrogen chloride is a gas containing hydrogen chloride with a gas containing oxygen in the presence of a catalyst.

The process of the instant invention is represented by the following formula:



The heat generated from this reaction is removed with the claimed heat exchange system which provides a jacket outside the tubular reactor.

Further, the reactor in the instantly claimed process is not heated in any step. In addition, the heat generated by the oxidation reaction of hydrogen chloride is removed by the heat exchange system. It is the removal of the heat generated that suppresses excessive hot spots in the reaction zones.

Turning to the cited prior art, EP '803 is directed to a fixed bed temperature swing catalytic process for chemical reactions. The process taught in EP '803 comprises the following steps:

- (a)  $\text{HCl} + \frac{1}{2}n \cdot \text{MO}_n \rightarrow \frac{1}{2}n \cdot \text{MCl}_{2n} + \frac{1}{2} \cdot \text{H}_2\text{O}$  (at 180-290°C)
- (b) Heat reactor to a temperature of 300-400°C
- (c)  $\text{MCl}_{2n} + n/2 \cdot \text{O}_2 \rightarrow n \cdot \text{Cl}_2 + \text{MO}_n$  (at 300-400°C)
- (d) Cool reactor to a temperature of 180-290°C, go back to step (a)

EP '803 teaches using fixed beds of catalysts and cycling through process steps (a) through (d) repeatedly without any transfer of catalyst from the vessel, in order to carry out the process efficiently. *See* EP '803, page 4, lines 14-16. In the EP '803 process, the heating and cooling steps (steps (b) and (d)) are necessary for the procedure known as temperature swing adsorption. In Figure 1 of EP '803, each of the reactors 10, 11, 12 and 13 have heat exchange means, such as heating or cooling coils 14 and 16. *See* EP '802, page 4, lines 14-16.

In light of these differences, Applicants respectively submit that EP '803 does not anticipate Claims 1-5.

Specifically, Applicants submit that the underlying chemical reactions of the claimed process and the process of EP '803 are different. The process of EP '803 involves repeating four

steps. Steps (a) and (b) require that the reactor is heated to a specific temperature in order for the reaction to proceed. The reactor in the instant invention, however, need not be heated since the reaction itself generates heat. Thus, these reactions are completely different.

In addition, the heat generated by the reaction in the instant invention is removed with a heat exchange system. The claimed heat exchange system provides a jacket outside the tubular reactor, which removes the heat of reaction generated. EP '803 does not teach or suggest such a heat exchange system.

Thus, Applicants respectfully request that the rejection of Claims 1-5 under 35 U.S.C. § 102 be reconsidered and withdrawn.

## **II. Rejection of Claims 1-15 under 35 U.S.C. § 103**

Claims 1-15 have been rejected under 35 U.S.C. § 103(a) as allegedly obvious over EP '803.

Applicants respectfully submit that EP '803 does not teach or suggest Claims 1-15.

Specifically, Applicants assert that EP '803 teaches away from the instantly claimed process. Applicants submit that the differences in the underlying chemical reactions of the processes would not suggest the instantly claimed process to one of ordinary skill in the art. *See* Section I, above.

Applicants also submit that the heat exchange system of EP '803 is significantly different from that of the instantly claimed invention. Thus, one ordinary skill in the art would have no suggestion to use as a heat exchange system, a jacket outside the tubular reactor, which removes the heat of reaction generated by the reaction.

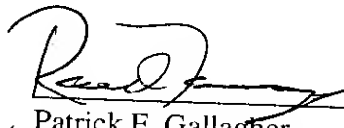
AMENDMENT UNDER 37 C.F.R. § 1.111  
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Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. § 103 be reconsidered and withdrawn.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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